Opportunities in

the forestry sector[1]

for integrating ecosystem-based approaches to climate change and disaster risk reduction

How is the forestry sector affected by climate and disaster risks?

There is no commonly agreed definition of the "forestry sector". A more comprehensive definition would include all economic activities that mostly depend on the production of goods and services from forests. This would include commercial activities that are dependent on the production of wood fibre (i.e. production of industrial roundwood, wood-fuel and charcoal; sawn wood and wood based panels; pulp and paper; and wooden furniture). It would also include activities associated with the commercial production and processing of non-wood forest products. The forestry sector also includes the subsistence use of wood and non-wood forest products (FAO, 2016). It could even include activities related to forest ecological process (such as carbon storage, nutrient cycling, water and air purification, and maintenance of wildlife habitat).

We depend on forests for our survival, from the air we breathe to the wood we use. Forests offer watershed protection, prevent soil erosion, protect biodiversity, mitigate climate change, and support adaptation. Forests further provide shelter, water, and food and fuel security for people. Forests are home to 80 per cent of the world's terrestrial biodiversity, and they also form the source of livelihoods for many different human settlements, including 70 million indigenous people. Forestry represents 5 per cent of the employment that relies on ecosystem services (ILO, 2018). In the context of the 2030 Agenda for Sustainable Development, it is also very important to take into consideration that, according to FAO (2018), "around 40 per cent of the extreme rural poor – or some 250 million people – live in forest and savannah areas, and forests may provide around 20 per cent of income for rural households in developing countries, both through cash income and by meeting subsistence needs". In addition, "around one-third of the world's population, or about 2.4 billion people, make use of wood to provide basic energy services such as cooking, boiling water and heating. Overall, forests supply about 40 per cent of global renewable energy in the form of wood fuel" (FAO, 2018).

Forests ...

... provide around **20 %** of income for rural households in developing countries

40 % of the extreme rural poor live in forest and savannah areas = 250 million people

... are home to **80 %** of the world's terrestrial biodiversity

... supply **40 %** of global renewable energy in the form of wood fuel

Forestry represents **5 %** of the employment that relies on ecosystem services

... are source of livelihoods for **70 million** indigenous people

[1] The development and authorship of the sectoral brief "Opportunities in the forestry sector for integrating ecosystem-based approaches to climate change and disaster risk reduction" was led by the World Wide Fund for Nature (WWF).

All these activities are directly or indirectly at risk due to a rapidly changing climate. Forest ecological integrity, a common indicator to assess its composition, structure and functionality, can be impacted by climate-related events, in multiple ways, according to the IPCC Fifth Assessment Report (AR5):

- "Within this century, magnitudes and rates of climate change represent high risk of abrupt and irreversible regional–scale change in the composition, structure, and function of terrestrial ecosystems" (IPCC, 2013).

- In addition, "increased tree mortality and associated forest dieback is projected to occur in many regions over the 21st century, due to increased temperatures and drought" (IPCC, 2013).

- "Forest dieback poses risks for carbon storage, biodiversity, wood production, water quality, amenity, and economic activity" (IPCC, 2013), and has effects on non-timber forest products and tourism.

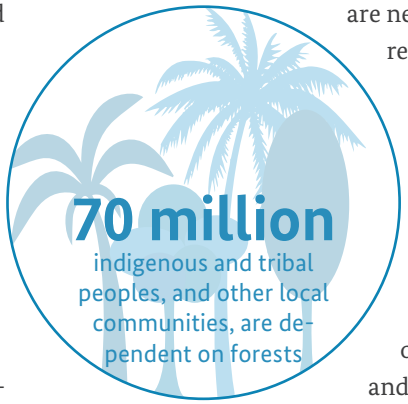
Variations in climate conditions and extreme events can alter the dynamics of plant diseases, reproduction rates, population distribution of species with commercial value, ecological interactions between species, trophic relationships and resilience of ecosystems (Dunlop & Brown, 2008) as well as frequency and severity of forest fires. These influences occur at the same time as effects of direct human intervention affecting on forest condition as result of timber extraction or leading to their permanent or temporal removal through disparate land-use change dynamics, as well as to the establishment of tree plantations. Altogether, multiple threats and drivers of change can lead to different scenarios of transformation, that will cause changes in both the ecological state of forest (i.e. shifts in composition, structure), and on its productivity, and will require innovative adaptive solutions from the forestry sector.

Ecosystem services provided by forests provide important economic value. However, their value and contributions to human well-being and economic activity are not accounted by countries' national accounts expressed in GDP nor in businesses' accounting of assets and market transactions. In Costa Rica, for example, the forestry sector contributes 0.1 per cent of GDP, as usually calculated from monetary transactions, but its contribution rises to 2.0 per cent when associated ecosystem services are considered. This is due to forests' contribution to agriculture and hydroelectric production (through water flow regulation), tourism (through aesthetic and cultural values) and the pharmaceutical sector (through biodiversity preservation) (ILO, 2018).

Why ecosystem-based approaches should be strengthened

Forests and climate mitigation are intrinsically linked since forests are a source of carbon emissions while also contributing to carbon removal from the atmosphere. Forest conversion and degradation are a source of carbon emissions that contribute to GHG emissions causing climate change. In contrast, conserving forests or avoiding their conversion to other land uses, as well as sustainable management of forests, both constitute mitigation and adaptation measures against this problem (WWF, 2018). In addition, sustainable forest management "can increase the resilience of communities by providing fundamental economic, social and environmental services such as food, wood energy, shelter, fodder and fibre, as well as income and employment and the conservation of biodiversity" (FAO, 2016).

Around 70 million indigenous and tribal peoples, and other local communities, are dependent on forests to meet their livelihood needs. While they face challenges from the impacts of climate change, or the development of market economies, their traditional knowledge on natural resources management, and traditional systems of production contribute to build a sustainable relationship with natural resources, which becomes fundamental for reducing emissions from deforestation and combating forest degradation, while at the same time fulfilling their social needs (ILO, 2017).



In the context of disaster risk reduction, forests increase resilience within hydrologic and soil systems, configure natural barriers to retain storms and winds, provide stability to prevent future landslides, configure micro-climates against heat waves and reduce risks of other erosion and desertification.

Within that context, different management strategies are employed by foresters to aim for achieving a climate-resilient tree species composition, that can also lead to improving the contribution of forests to climate mitigation, resilience, as well as their economic benefits. Due to the long rotation times, foresters are usually well-practiced at planning for the long-term, however not all strategies (e.g. introduction of exotic species, GMOs) are necessarily beneficial for ecosystem resilience and there is a high risk of maladaptation. Undertaking and accessing relevant research and implementing adaptive management are essential components of management planning. Therefore, adaptive and climate smart forest management is a key component of a integrated landscape, territorial and watershed approach that can ensure resilience to shocks but also bring other social, economic and environmental co-benefits (FAO 2017a).

Typical ecosystem-based approaches, technologies and techniques within the forestry sector include the following:

Approach / technology examples [2]	Environmental benefit	Risk reduction benefit	Socio-economic benefit
Forest conservation and management: strategies to manage ecosystems and increase forest integrity: including new protected areas, management of strategic areas for carbon capture, increase governance of forest and planning of connectivity.	Population conservation, erosion prevention, ecological integrity	Buffering of extreme temperatures and precipitation, flood risk reduction, storm risk reduction	Income generation, job creation, provision of non-timber forest products
Sustainable forest management according with the study of opportunities, climatic threats and risks, futures scenarios of use of the land, local or regional priorities and markets.	Population conservation, ecological integrity	Buffering of extreme temperatures and precipitation, flood risk reduction, storm risk reduction	Income generation, job creation, provision of wood, fuel and fibre
Forest landscape / ecological restoration: recovery, rehabilitation and / or restoration of degraded forests.	Population conservation, increase of ecological integrity, erosion prevention, carbon sequestration, climate regulation, recreation, fresh water provision, habitats for species	Buffering of extreme, temperatures and precipitation, flood risk reduction, storm risk reduction	Income generation, job creation provision of wood, fuel and fibre

Source: (Lhumeau & Cordero 2012, WWF 2018)

[2] The magnitude of the benefits and/or main trade-offs associated with different environmental and socio-economic benefits are not analyzed in this document. There is also no distinction between more commercial-driven practices from others that can be associated with traditional local management of natural resources.

Photos, from top to bottom:
❶ Aerial view of the Amazon rainforest, near Manaus, the capital of the Brazilian state of Amazonas. Brazil. © Flickr, creative commons, Neil Palmer/CIAT, www.flickr.com/photos/cifor/35525190330, is licensed under CC BY 2.0 ❷ Forest garden in Borneo, Indonesia. © GIZ Indonesia, Forests and Climate Change Programme, FORCLIME ❸ Forest restoration. © GIZ/Andrea Bender

Existing opportunities & required action

Entry points	Examples
International agreements and pledges	REDD+ strategies, national adaptation strategies, NDCs in the context of UNFCCC, biodiversity goals under CBD, and SDGs national strategies, Bonn Challenge and Forest Landscape Restoration pledges.
National and sub-national policies	Forest sector policy, fiscal incentives and subsidies, land use and environmental policy, finance, and trade agreements.
Planning instruments	At the sector level (e.g. long- and medium-term forest sector plans, sustainable forest management strategies, skills development strategies); at the landscape-level (e.g. ecological and economic zoning); and at the production and / or management units level (e.g. forest management plans, training, conflict resolution, and benefit sharing schemes).
Command and control instruments	Transnational regulations (e.g. Forest Law Enforcement, Governance and Trade (FLEGT)) and national forest-related regulations.
Economic and fiscal instruments	Timber taxes, Payments for Ecosystem Services (they can also be considered under the national / sub national policies).
Informative measures	Forest extension, farmer-to-farmer schemes, collaborative agreements between companies or smallholders, or traditional systems based on local knowledge.
Voluntary measures	Voluntary certification schemes including forest certification (e.g. FSC) and other social and environmental safeguards.
Institutions	Organizational strengthening, improved transparency, streamlining bureaucratic processes, adopting high-tech monitoring technologies, targeting, for example, Ministries of Agriculture and Forestry, forest industry, forest user associations.
Management types	Sustainable forest management, collaborative and participatory forest management.

Public Employment Programmes (PEPs) can provide alternative employment with better working conditions and income for poor persons who are engaged in deforestation and over-harvesting. PEPs can direct their labour towards environmentally sound activities such as reforestation and other agro-forestry activities, instead of environmental destruction (ILO, 2018).

Photo: Aerial view of the Amazon rainforest, near Manaus, the capital of the Brazilian state of Amazonas. Brazil. © Flickr, creative commons, Neil Palmer/CIAT, www.flickr.com/photos/cifor/35525190330, is licensed under CC BY 2.0

References

Dunlop, M & P. R. Brown. 2008. Implications of climate change for Australia's National Reserve System: A Preliminary Assessment. Report to Department of Climate Change, February 2008. Department of Climate Change, Canberra, Australia. 155 p.

FAO. 2016. Forest and Climate Change. 16 p. www.fao.org/forestry/climatechange/en

FAO 2017a. Landscapes for life: Approaches to landscape management for sustainable food and agriculture. www.fao.org/3/i8324en/i8324en.pdf

Forests & Climate Change. 2018. wwf.panda.org/about_our_earth/deforestation/climate_change_and_forest

GIZ. 2013. Forests and Climate Change Adaptation: a twofold approach.

ILO 2018. World Employment and Social Outlook 2018: Greening with jobs International Labour Office – Geneva: ILO.

ILO, Indigenous Peoples and Climate Change: From Victims to Change Agents through Decent Work, 2017.

IPCC. 2014. Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C. B., V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, and L. L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

Lhumeau. A & D. Cordero. 2012. Adaptación basada en Ecosistemas: una respuesta al cambio climático. UICN, Quito, Ecuador. 17 pp.

WWF. 2018. WWF Living Forest Report. Chapter 4 wwf.panda.org/about_our_earth/deforestation/forest_publications_news_and_reports/living_forests_report

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